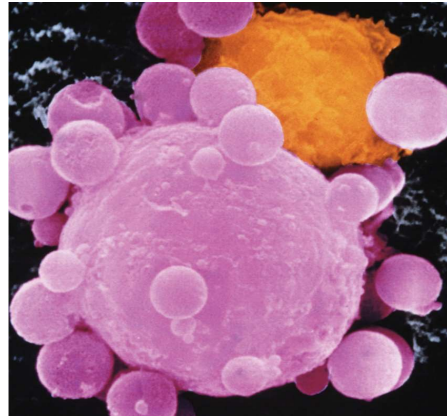


## Chapter 4.1

What is Histology?

How to Interpret Tissue Sections with a Microscope?

What Are the Four Tissue Types?

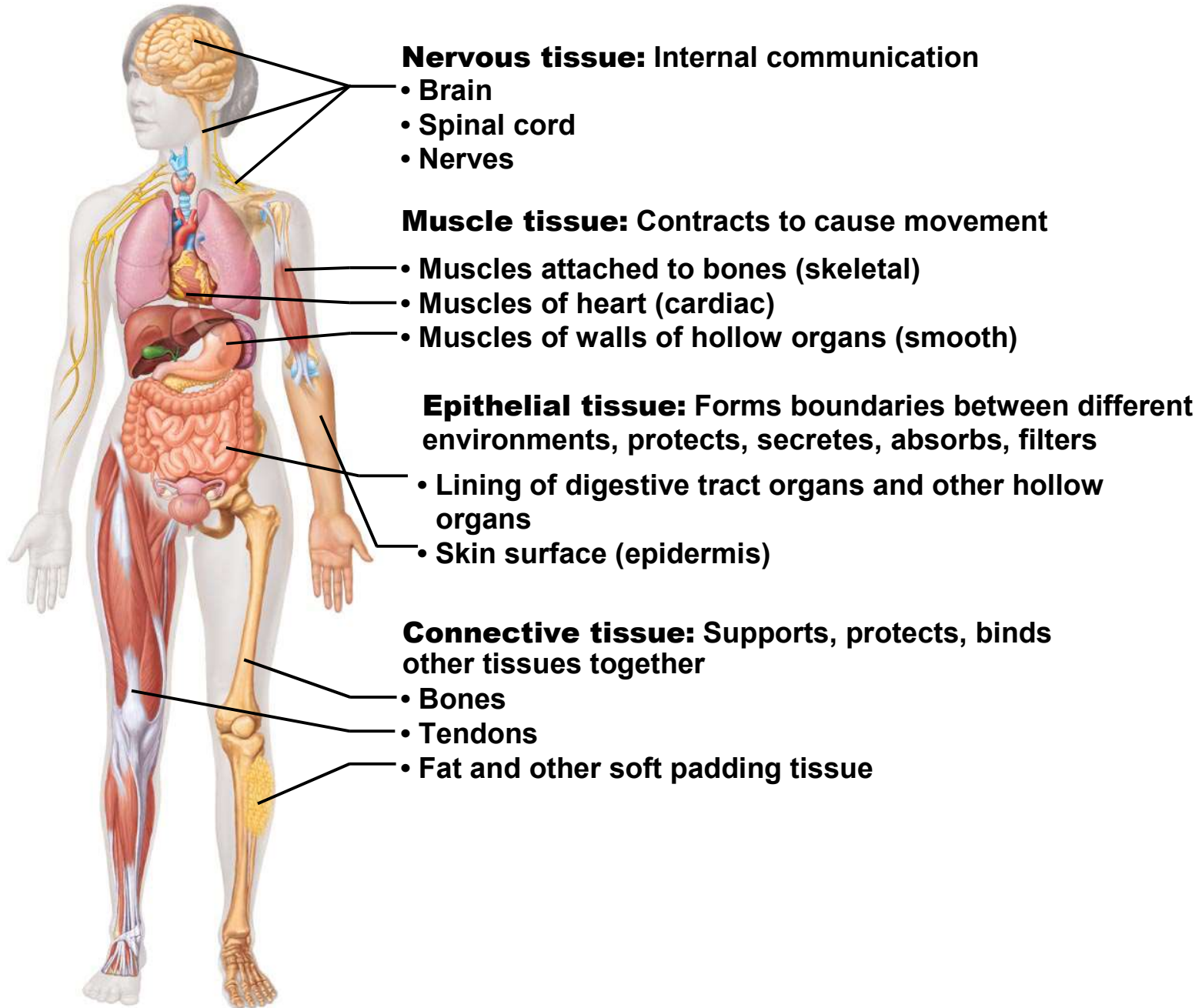


# What is Histology?

---

- Histology is the study of **microscopic anatomy** and the arrangement of tissue into organs
- Hierarchy of Human Body Organization // Review = atoms - molecules - organelles - cells - **tissues** - organs - systems
- What is tissue?
  - a group of similar cells and their cell products
  - arise from the same region of the embryo
  - each tissue type have cells with similar structure and function that work together to perform a specific physiological function within an organ.
- Four tissue type: epithelial / muscle / nervous / connective

# What are the four tissue types?

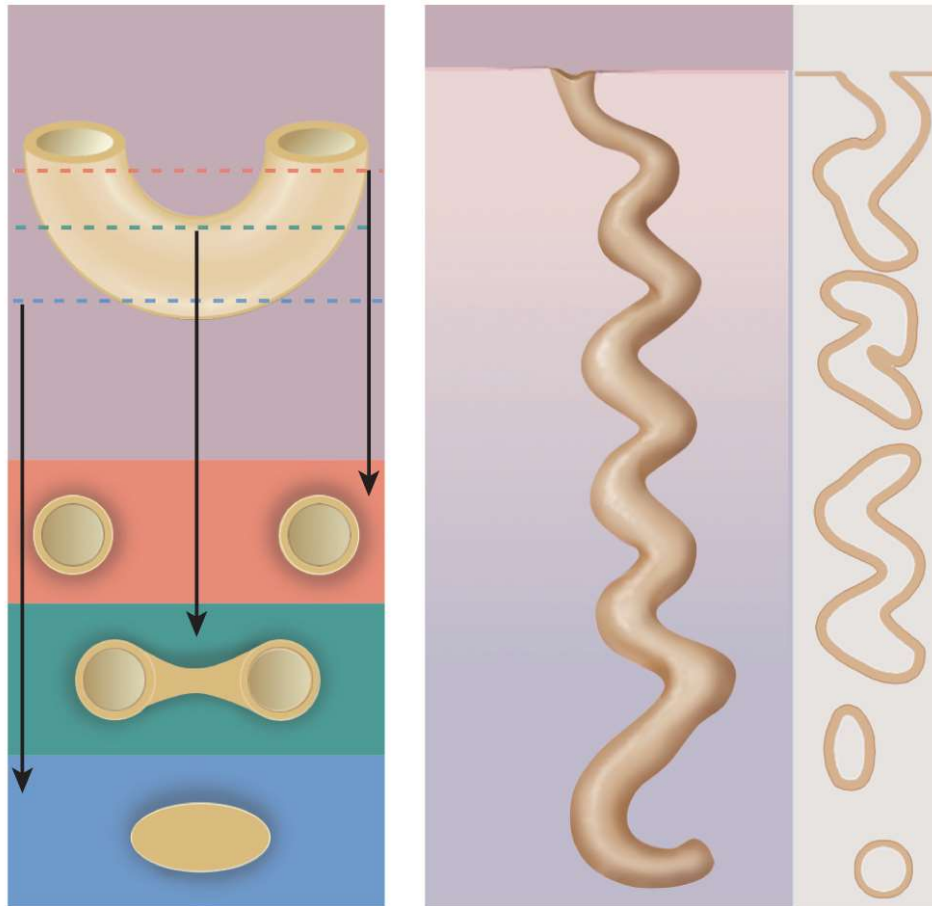


# Tissue Cells vs Tissue Matrix

---

- The four primary tissues **differ from one another** by
  - types and functions of their cells
  - the characteristics of the matrix (material made by cells and excreted outside of the cell)
  - the relative amount of space occupied by the cells and matrix
- The **matrix** is composed of // “hydrated” fibrous proteins = clear gel substance (the “glue” that holds cells together)
  - Matrix also called:
    - ground substance
    - tissue fluid
    - extracellular fluid (ECF)
    - interstitial fluid
    - tissue gel

# How to Interpreting Tissue Sections Using a Microscope



# Interpreting Tissue Sections

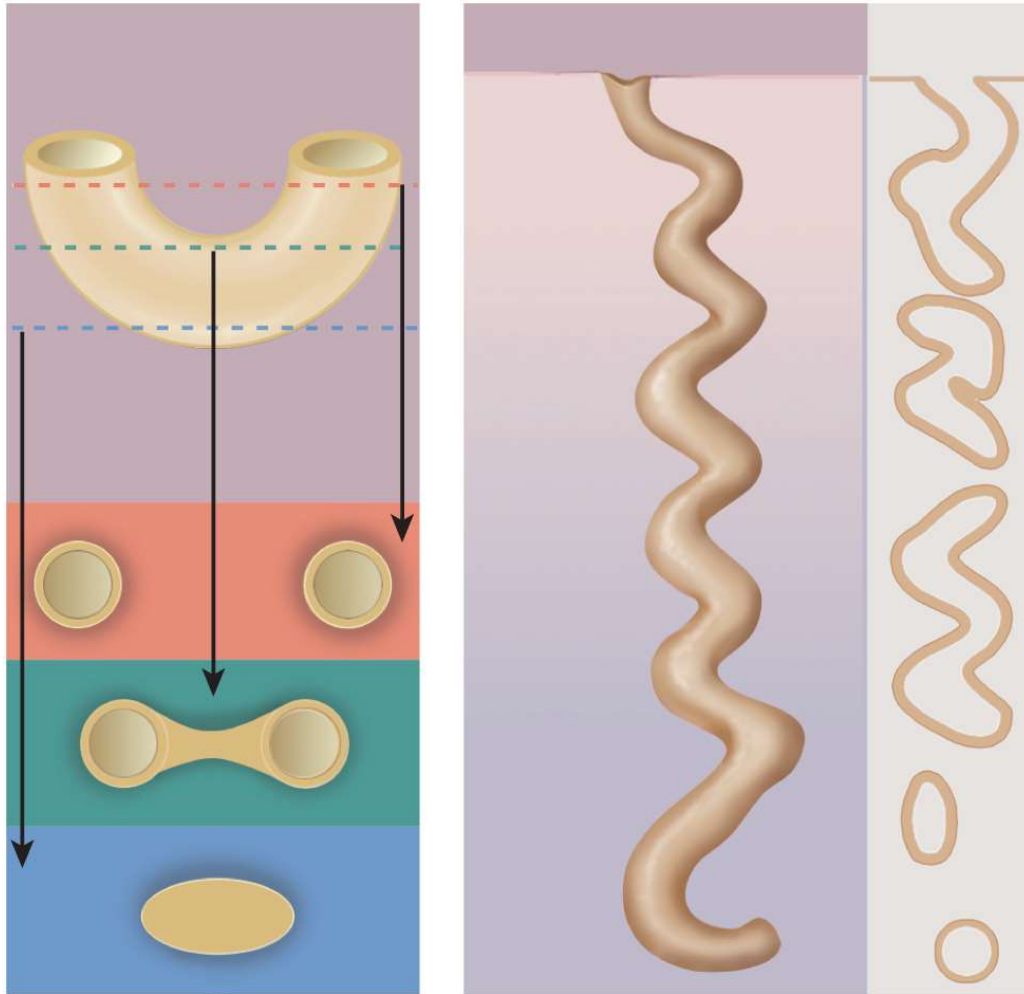
---

- Microscopic sectioning converts a **three-dimensional structure into a two-dimensional slice**
- Preparation of histological specimens
  - fixative prevents decay (e.g. formalin)
  - histological sections – tissue is sliced into thin sections one or two cells thick
  - stains – tissue is mounted on slides and artificially colored with histological stain - increases contrast // stains bind to different cellular components and increases contrast



# Sectioning Hollow Structures

---



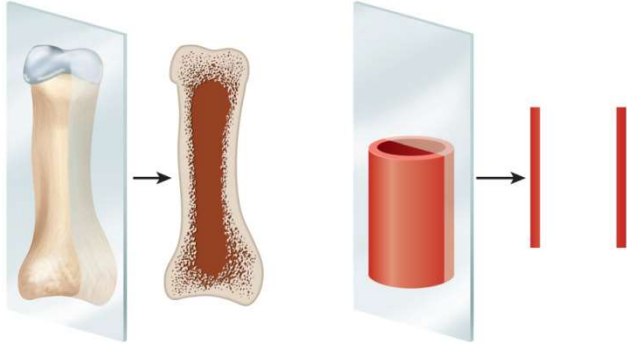
- **cross section** of blood vessel, gut, or other tubular organ.
- **longitudinal section** of a sweat gland /// notice what a single slice could look like.



# Types of Tissue Sections

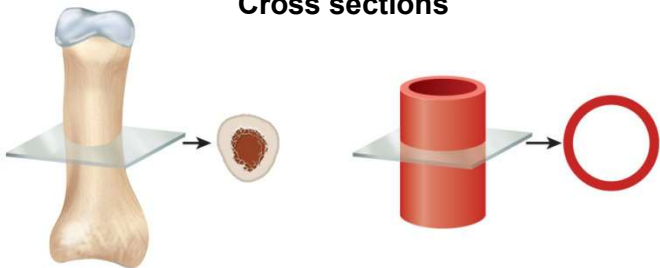
---

Longitudinal sections



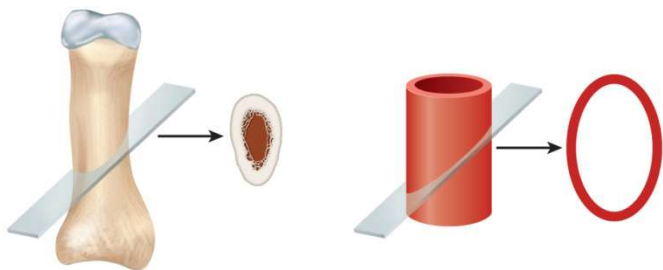
- **longitudinal section (l.s.)**
  - tissue cut along long direction of organ

Cross sections



- **cross section (c.s. or x.s.) or transverse section (t.s.)**
  - tissue cut perpendicular to length of organ

Oblique sections



- **oblique section**
  - tissue cut at angle between cross and longitudinal section

# Non-sectioned Preparation

---

- **Smear** – tissue is rubbed or spread across the slide and often a cover slip is placed over the tissue sample /// E.g. blood smear to identify formed elements
- **Spread** – cobwebby tissue is laid out on a slide without cover slip /// E.g. areolar tissue